



2003 AFCEE Technology Transfer Workshop

San Antonio, Texas

Promoting Readiness through Environmental Stewardship

RPO Inventory and Prioritization Tool

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Earth Tech

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Earth Tech's Role

- Technical Development of the RPO Implementation Tool
 - Initial & Detailed Questionnaires
 - Database
 - Site Data Sheets
 - Inventory & Prioritization

- Application of Tool at Air Force Materiel Command Facilities



Initial Questionnaire

1. Major Command:	Air Force Materiel Command								
2. Base/Plant Name?	Air Force Plant 4								
3. Number of Remediation Systems at Base/Plant?	5								
4. Is there a Base-/Plant-Wide Long-Term Monitoring (LTM) Program?	Yes								
5. Name/Contact Information for person filling out questionnaire:									
Name:	George Walters								
Address:	Aeronautical Systems Center, Building 8								
	1801 Tenth Street, Suite 2								
	WPAFB, OH 45433-7626								
Phone Number:	(937) 255-1988								
Fax Number:	(937) 255-9985								
Email Address:	George.Walters@wpafb.af.mil								
6. Inventory of Remediation Systems and Base-/Plant-Wide LTM Programs:									
Remediation Site Name:	System/LTM Program Name:	Contact Name / Employer / Phone # / Email Address / Access Version:	System Type:						
Landfill No. 3	Vacuum-Enhanced Pumping System	Rick Wice / Shaw E&I / (412) 858-3309 / richard.wice@shawgrp.com / Access 2000	Dual-Phase						
East Parking Lot	Pump & Treat System	Rick Wice / Shaw E&I / (412) 858-3309 / richard.wice@shawgrp.com / Access 2000	Pump & Treat						
Building 181	Electrical resistance heating system	Steve Fain / URS / (512) 419-5072 / stephen_fain@urscorp.com / Access 2000	Thermal technology						
Building 181	SVE System	Rick Wice / Shaw E&I / (412) 858-3309 / richard.wice@shawgrp.com / Access 2000	Dual-Phase						
Fuel Saturation Area No. 1	Pump & Treat System	Rick Wice / Shaw E&I / (412) 858-3309 / richard.wice@shawgrp.com / Access 2000	Pump & Treat						
AFP4	Plant-Wide LTM Program	Dave Parse / Earth Tech / (703) 706-0508 / david.parse@earthtech.com / Access 97	Plant-Wide LTM Program						



Detailed Questionnaire

Remediation System Inventory and Prioritization Detailed Questionnaire

1. Select Major Command (Click Down Arrow and Highlight to Select):

Air Force Materiel Command

2. Select Facility (Click Down Arrow and Highlight to Select):

AFP 4

3. Select Site (Click Down Arrow and Highlight to Select):

Building 181

4. Select Remediation System (Highlight to Select):

Electrical Resistance Heating System
SVE System

Click to Enter/Edit Remediation
System Inventory Data

Click to Exit Software



Detailed Questionnaire (cont'd)

Remediation System Data Inventory		
1. Major Command:	Air Force Materiel Command	
2. Facility:	AFP 4	
3. Site:	Building 181	
4. Remediation System:	SVE System	
Click to Return to Previous Form		
5. Click to Edit/Add Contacts for the Remediation System		
6. Type of Remediation System?	Oxidation - Continuous Injection (e.g., permanganate, ozone, peroxide)	
7. Legal Driver for Remediation?	Pump & Treat	
8. Legal Status of Remedy?	Soil-Vapor Extraction (SVE)	
9. LNAPL known to be present?	Dual-Phase (Groundwater & Soil Gas)	
10. DNAPL known to be present?	Air Sparging/Soil-Vapor Extraction	
11. Average Annual Operation and Maintenance Costs (\$/year)?	UVB wells	
	Bioventing	
	Biosparging	
	Nutrient Enhancement - Single Injection (e.g., HRC, ORC, vegetable oil)	
	for Groundwater/Soil vapor monitoring?	
	\$0.00	\$0.00
14. Highlight the Primary COC(s) for the Remediation System	Please provide below any general comments or a brief explanation for any of the above questions that were not answered or were answered "Other"	
Chlorinated Hydrocarbons (e.g., TCE, TCA, DCE, vinyl chloride)		
Petroleum Hydrocarbons (e.g., BTEX)		
Semivolatile Organic Compounds		
Polynuclear Aromatic Hydrocarbons (PAHs) —		
Pesticides/Herbicides		
Polychlorinated Biphenyls (PCBs)		
Perchlorates		
Metals		
Other		
Click to Edit/Add Remediation System Optimization Data		Click to View Inventory Report



Detailed Questionnaire (cont'd)

Remediation System Data Inventory		
1. Major Command:	Air Force Materiel Command	
2. Facility:	AFP 4	
3. Site:	Building 181	
4. Remediation System:	SVE System	
Click to Return to Previous Form		
5. Click to Edit/Add Contacts for the Remediation System		
6. Type of Remediation System?	Soil-Vapor Extraction (SVE)	
7. Legal Driver for Remediation?		
8. Legal Status of Remedy?		
9. LNAPL known to be present?		
10. DNAPL known to be present?		
11. Average Annual Operation and Maintenance Costs (\$/year)?	12. Portion of Average Annual Operation and Maintenance Costs (\$/year) Used Only for Groundwater/Soil Vapor Monitoring?	13. Operation and Maintenance Costs (\$) Over the Past 12 Months?
\$0.00	\$0.00	\$0.00
14. Highlight the Primary COC(s) for the Remediation System		Please provide below any general comments or a brief explanation for any of the above questions that were not answered or were answered "Other"
<ul style="list-style-type: none">Chlorinated Hydrocarbons (e.g., TCE, TCA, DCE, vinyl chloride)Petroleum Hydrocarbons (e.g., BTEX)Semivolatile Organic CompoundsPolynuclear Aromatic Hydrocarbons (PAHs)Pesticides/HerbicidesPolychlorinated Biphenyls (PCBs)PerchloratesMetalsOther		
Click to Edit/Add Remediation System Optimization Data		Click to View Inventory Report



Detailed Questionnaire (cont'd)

Soil-Vapor Extraction

Major Command: Air Force Materiel Command

Facility: AFP 4

Site: Building 181

Remediation System: SVE System

[Click to Return to
Previous Form](#)

[Click to View Detailed
Remediation System
Report](#)

15. Primary Remedial Objective?

16. When did the System Become Operational (mm/yyyy)?

17. Expected Completion Date for Remedial Action (mm/yyyy)?

18. Is there a Documented Conceptual Site Model?

19. Are the Remedial Objectives Being Achieved?

20. Has System Effectiveness Been Evaluated?

23. Number of Soil-Vapor Extraction Wells (In Use)?

24. Soil-Vapor Extraction Rate (cubic feet/minute)?

25. Estimated Average System Downtime (weeks/year)?

0

0

0

Monitoring

27. Number of Soil-Vapor Wells Regularly Monitored?

28. Frequency of Soil-Vapor Monitoring (events/year)?

0

0

29. Please provide below: [1] average influent and effluent concentrations for the primary COCs; [2] a brief summary of any previous system performance evaluations; [3] any general comments; and [4] a brief explanation for any of the above questions that were not answered or were answered "Other"

21. Expected Degree of Difficulty in Implementing
Minor Changes to the Remediation System?

22. Expected Degree of Difficulty in Implementing
Major Changes to the Remediation System?

26. Highlight One or More of the Following
Aboveground Treatment Processes:

Carbon adsorption
Flare
Catalytic oxidation
None/other/not sure



Detailed Questionnaire (cont'd)

Remediation System Data Inventory		
1. Major Command:	Air Force Materiel Command	
2. Facility:	AFP 4	
3. Site:	Building 181	
4. Remediation System:	Electrical Resistance Heating System	
Click to Return to Previous Form		
5. Click to Edit/Add Contacts for the Remediation System		
6. Type of Remediation System?	Dual-Phase (Groundwater & Soil Gas)	
7. Legal Driver for Remediation?		
8. Legal Status of Remedy?		
9. LNAPL known to be present?		
10. DNAPL known to be present?		
11. Average Annual Operation and Maintenance Costs (\$/year)?	12. Portion of Average Annual Operation and Maintenance Costs (\$/year) Used Only for Groundwater/Soil Vapor Monitoring?	13. Operation and Maintenance Costs (\$) Over the Past 12 Months?
\$0.00	\$0.00	\$0.00
14. Highlight the Primary COC(s) for the Remediation System		Please provide below any general comments or a brief explanation for any of the above questions that were not answered or were answered "Other"
<div>Chlorinated Hydrocarbons (e.g., TCE, TCA, DCE, vinyl chloride)</div> <div>Petroleum Hydrocarbons (e.g., BTEX)</div> <div>Semivolatile Organic Compounds</div> <div>Polynuclear Aromatic Hydrocarbons (PAHs)</div> <div>Pesticides/Herbicides</div> <div>Polychlorinated Biphenyls (PCBs)</div> <div>Perchlorates</div> <div>Metals</div> <div>Other</div>		
Click to Edit/Add Remediation System Optimization Data		Click to View Inventory Report



Detailed Questionnaire (cont'd)

Dual-Phase (Groundwater and Soil Gas)	
Major Command:	Air Force Materiel Command
Facility:	AFP 4
Site:	Building 181
Remediation System:	SVE System
Click to Return to Previous Form Click to View Detailed Remediation System Report	
15. Primary Remedial Objective?	
16. When did the System Become Operational (mm/yyyy)?	
17. Expected Completion Date for Remedial Action (mm/yyyy)?	
18. Is there a Documented Conceptual Site Model?	
19. Are the Remedial Objectives Being Achieved?	
20. Is the System Successfully Controlling Plume Migration?	
21. Has System Effectiveness Been Evaluated?	
22. Expected Degree of Difficulty in Implementing Minor Changes to the Remediation System?	
23. Expected Degree of Difficulty in Implementing Major Changes to the Remediation System?	
24. Number of Groundwater Extraction Wells (In Use)?	0
25. Number of Soil-Vapor Extraction Wells (In Use)?	0
26. Number of Dual-Phase Wells (In Use)?	0
27. Number of Groundwater Injection Wells (In Use)?	0
28. Groundwater Extraction Rate (gallons/minute)?	0
29. Soil-Vapor Extraction Rate (cubic feet/minute)?	0
30. Groundwater Injection Rate (gallons/minute)?	0
31. Estimated Average System Downtime (weeks/year)?	0
32. Highlight One or More of the Following Aboveground Treatment Processes:	
Air stripping Carbon adsorption Catalytic oxidation UV oxidation Flare Metals precipitation Filtration Biological treatment Off-gas treatment Ion exchange Reverse osmosis None/other/not sure	
Monitoring	
33. Number of Groundwater Wells Regularly Monitored?	0
34. Frequency of Groundwater Monitoring (events/year)?	0
35. Number of Soil-Vapor Wells Regularly Monitored?	0
36. Frequency of Soil-Vapor Monitoring (events/year)?	0
37. Please provide below: [1] average influent and effluent concentrations for the primary COCs; [2] a brief summary of any previous system performance evaluations; [3] any general comments; and [4] a brief explanation for any of the above questions that were not answered or were answered "Other"	
[Text area for response to question 37]	



Detailed Questionnaire (cont'd)

Remediation System Data Inventory		
1. Major Command:	Air Force Materiel Command	
2. Facility:	AFP 4	
3. Site:	Building 181	
4. Remediation System:	Electrical Resistance Heating System	
Click to Return to Previous Form		
5. Click to Edit/Add Contacts for the Remediation System		
6. Type of Remediation System?	Nutrient Enhancement - Continuous Injection (e.g., HRC, ORC, vegetable oil)	
7. Legal Driver for Remediation?		
8. Legal Status of Remedy?		
9. LNAPL known to be present?		
10. DNAPL known to be present?		
11. Average Annual Operation and Maintenance Costs (\$/year)?	12. Portion of Average Annual Operation and Maintenance Costs (\$/year) Used Only for Groundwater/Soil Vapor Monitoring?	13. Operation and Maintenance Costs (\$) Over the Past 12 Months?
\$0.00	\$0.00	\$0.00
14. Highlight the Primary COC(s) for the Remediation System		Please provide below any general comments or a brief explanation for any of the above questions that were not answered or were answered "Other"
<div>Chlorinated Hydrocarbons (e.g., TCE, TCA, DCE, vinyl chloride)</div> <div>Petroleum Hydrocarbons (e.g., BTEX)</div> <div>Semivolatile Organic Compounds</div> <div>Polynuclear Aromatic Hydrocarbons (PAHs)</div> <div>Pesticides/Herbicides</div> <div>Polychlorinated Biphenyls (PCBs)</div> <div>Perchlorates</div> <div>Metals</div> <div>Other</div>		
Click to Edit/Add Remediation System Optimization Data		Click to View Inventory Report



Detailed Questionnaire (cont'd)

Nutrient Enhancement (Continuous Injection)	
Major Command:	Air Force Materiel Command
Facility:	AFP 4
Site:	Building 181
Remediation System:	SVE System

[Click to Return to Previous Form](#)[Click to View Detailed Remediation System Report](#)

15. Primary Remedial Objective?	
16. When did the System Become Operational (mm/yyyy)?	
17. Expected Completion Date for Remedial Action (mm/yyyy)?	
18. Is there a Documented Conceptual Site Model?	
19. Are the Remedial Objectives Being Achieved?	
20. Has System Effectiveness Been Evaluated?	
23. Type of Nutrient?	
24. Number of Injection Wells Used to Apply Nutrient?	0
25. Water Source for Nutrient Injection?	
26. Total Nutrient Injection Rate (gallons/minute)?	0
27. Total Amount (lbs) of Nutrient Injected per Year?	0
28. Estimated Average System Downtime (weeks/year)?	0

21. Expected Degree of Difficulty in Implementing Minor Changes to the Remediation System?
[Dropdown]

22. Expected Degree of Difficulty in Implementing Major Changes to the Remediation System?
[Dropdown]

Groundwater Monitoring	
29. Number of Groundwater Wells Regularly Monitored?	0
30. Frequency of Groundwater Monitoring (events/year)?	0
31. Please provide below: [1] average influent and effluent concentrations for the primary COCs; [2] a brief summary of any previous system performance evaluations; [3] any general comments; and [4] a brief explanation for any of the above questions that were not answered or were answered "Other"	
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Detailed Questionnaire (cont'd)

Remediation System Data Inventory		
1. Major Command:	Air Force Materiel Command	
2. Facility:	AFP 4	
3. Site:	Building 181	
4. Remediation System:	Electrical Resistance Heating System	
Click to Return to Previous Form		
5. Click to Edit/Add Contacts for the Remediation System		
6. Type of Remediation System?	Thermal Technology (e.g., electrical resistance heating, steam enhanced extraction) ▼	
7. Legal Driver for Remediation?	▼	
8. Legal Status of Remedy?	▼	
9. LNAPL known to be present?	▼	
10. DNAPL known to be present?	▼	
11. Average Annual Operation and Maintenance Costs (\$/year)?	12. Portion of Average Annual Operation and Maintenance Costs (\$/year) Used Only for Groundwater/Soil Vapor Monitoring?	13. Operation and Maintenance Costs (\$) Over the Past 12 Months?
\$0.00	\$0.00	\$0.00
14. Highlight the Primary COC(s) for the Remediation System		Please provide below any general comments or a brief explanation for any of the above questions that were not answered or were answered "Other"
<input type="checkbox"/> Chlorinated Hydrocarbons (e.g., TCE, TCA, DCE, vinyl chloride) <input type="checkbox"/> Petroleum Hydrocarbons (e.g., BTEX) <input type="checkbox"/> Semivolatile Organic Compounds <input type="checkbox"/> Polynuclear Aromatic Hydrocarbons (PAHs) <input type="checkbox"/> Pesticides/Herbicides <input type="checkbox"/> Polychlorinated Biphenyls (PCBs) <input type="checkbox"/> Perchlorates <input type="checkbox"/> Metals <input type="checkbox"/> Other		
Click to Edit/Add Remediation System Optimization Data		Click to View Inventory Report



Detailed Questionnaire (cont'd)

